



Course Specifications

Course Title:	Calculus (3)
Course Code:	202365-3
Program:	Bachelor of Computer Engineering
Department:	Mathematics
College:	College of Science
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 5/3
4. Pre-requisites for this course (if any): Calculus (2) (202263-3)
5. Co-requisites for this course (if any): NON

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	Blended	0	0
3	E-learning	0	0
4	Distance learning	0	0
5	Other	0	0

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	0
3	Tutorial	0
4	Others (specify)	0
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

This course covers the calculus of several variables and is the third calculus course in a three-course sequence. Topics include functions of several variables, partial derivatives, multiple integrals in two dimensions, solid analytical geometry, and vector-valued functions. Upon completion, students should be able to solve problems involving vectors and functions of several variables

2. Course Main Objective

Evaluate derivatives for complexly constructed elementary functions, evaluate definite and indefinite integrals, evaluate limits using algebraic, geometric, analytic techniques and use derivatives and integrals to model and solve applied problems

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	Knowledge and Understanding	

CLOs		Aligned PLOs
2	Skills :	
2.1	Convert between coordinate systems in three dimensions, and recognize and graph standard equation forms in three dimensions	S1
2.2	Differentiate and integrate vector-valued functions	S1
2.3	Solve practical problems involving vector-valued functions.	S1
2.4	Compute the partial derivatives and multiple integrals of selected functions of several variables	S1
3	Values:	
3.1	Evaluate limits and study the continuity of vector-valued functions	C1
3.2	Evaluate the limits and study the continuity of functions of several variables	C1

C. Course Content

No	List of Topics	Contact Hours
1	Three Dimensional Coordinate Systems and Vectors	2
2	The Dot Product and The Cross Product	3
3	Equations of Lines and Planes and Cylinders and Quadric Surfaces	2
4	Vector Functions and Space Curves, Derivatives and Integrals of Vector Functions	3
5	Arc Length and Curvature, Motion in Space: Velocity and Acceleration	2
6	Exam 1 , Functions of Several Variables	3
7	Limits and Continuity ,Partial Derivatives	2
8	Tangent Planes and Linear Approximations, The Chain Rule	3
9	Directional Derivatives and the Gradient Vector, Maximum and Minimum Values	2
10	Lagrange Multipliers, Exam 2	3
11	Double Integrals over Rectangles, Iterated Integrals	4
12	Double Integrals over General Regions, Double Integrals in Polar Coordinates	4
13	Applications of Double Integrals, Triple Integrals	4
14	Triple Integrals in Cylindrical Coordinates ,Triple Integrals in Spherical Coordinates	4
15	Change of Variables in Multiple Coordinates ,Exam 3 –Review	4
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
2.0	Skills		
2.1	Convert between coordinate systems in three dimensions, and recognize and	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	graph standard equation forms in three dimensions		
2.2	Differentiate and integrate vector-valued functions	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
2.3	Solve practical problems involving vector-valued functions.	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
2.4	Compute the partial derivatives and multiple integrals of selected functions of several variables	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
3.0	Values		
3.1	Evaluate limits and study the continuity of vector-valued functions	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments
3.2	Evaluate the limits and study the continuity of functions of several variables	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments	3,4,6,8,10	10%
2	Midterm Exam 1	4	20%
3	Midterm Exam 2	10	20%
4	Final Exam	16	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Academic advising and counseling of students is an important component of teaching; student academic advising is a mandatory requirement of College of Computers and Information Technology (CCIT). Appropriate student advising provides support needed for the student during times of difficulty. In addition, it helps the student to build a close relationship with his/her advisor and to provide student motivation and involvement with the institution.

In addition, since faculty are usually the first to recognize that a student is having difficulty, faculty members play a key role in developing solutions for the students or referring them to appropriate services. Faculty members also participate in the formal student-mentoring program.

Additional counseling is provided by course directors, who provide students with academic reinforcement and assistance and refer “at risk” students to the Vice Dean for Academic Affairs and the Vice Dean for female section.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	James Stewart, Calculus; Early Transcendentals, Cengage Learning, 2011
Essential References Materials	NON.
Electronic Materials	NON
Other Learning Materials	NON

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> A Lecture room appropriate for maximum 25 students with a personal computer, a data show and a smart board. A Lab room appropriate for maximum 15 students with a personal computer, a data show and a smart board.
Technology Resources (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> NON
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students	Students' surveys and Students course evaluation
Improvement of Teaching	Course Coordinator	deficiencies based on the student Evaluation, faculty input, course file, and program assessment
Verifying Standards of Student Achievement	Curriculum Committee	<ul style="list-style-type: none"> Review CAF (Course assessment file) Alumni surveys. Periodic exchange and remarking of tests or a sample

Evaluation Areas/Issues	Evaluators	Evaluation Methods
		of assignments with staff at another

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

